

Nevada
Environmental
Restoration
Project

DOE/NV--1173



Corrective Action Plan for Corrective Action Unit 145: Wells and Storage Holes, Nevada Test Site, Nevada

Controlled Copy No.: _____

Revision: 0

November 2006

Environmental Restoration
Project



U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office

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**CORRECTIVE ACTION PLAN
FOR CORRECTIVE ACTION UNIT 145:
WELLS AND STORAGE HOLES
NEVADA TEST SITE, NEVADA**

**U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office
Las Vegas, Nevada**

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CORRECTIVE ACTION UNIT 145:
WELLS AND STORAGE HOLES
NEVADA TEST SITE, NEVADA**

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TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS	vii
EXECUTIVE SUMMARY	ix
1.0 INTRODUCTION	1
1.1 PURPOSE.....	1
1.2 SCOPE.....	1
1.3 CORRECTIVE ACTION PLAN CONTENTS.....	4
2.0 DETAILED STATEMENT OF WORK.....	5
2.1 CORRECTIVE ACTIONS	5
2.1.1 Alternative 1 - No Further Action.....	5
2.1.1.1 CAS 03-20-01, Core Storage Holes	5
2.1.1.2 CAS 03-20-02, Decon Pad and Sump	5
2.1.1.3 CAS 03-20-04, Injection Wells	5
2.1.1.4 CAS 03-20-08, Injection Well.....	8
2.1.1.5 CAS 03-99-13, Drain and Injection Well.....	8
2.1.2 Alternative 3 – Close in Place with Administrative Controls	8
2.1.2.1 CAS 03-25-01, Oil Spills.....	8
2.2 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL	14
2.2.1 Construction Field Sample Collection Activities	14
2.2.2 Construction Laboratory/Analytical Data Quality Indicators	14
2.3 WASTE MANAGEMENT	14
2.3.1 Waste Minimization.....	14
2.3.2 Waste Types.....	15
2.4 CONFIRMATION OF CORRECTIVE ACTIONS.....	16
2.4.1 No Further Action Sites	16
2.4.2 Close in Place with Administrative Controls.....	16
2.4.3 Sample Collection Methods.....	16
2.4.4 Laboratory/Analytical Data Quality Indicators	17
2.5 PERMITS	19
2.5.1 National Environmental Policy Act Checklist.....	19
2.5.2 NNSA/NSO Real Estate/Operations Permit	19
2.5.3 Radiological Work Permit	19
2.5.4 Utility Clearances, Excavation Permits, and Blind Penetration Permits	19
3.0 SCHEDULE.....	21
4.0 POST-CLOSURE PLAN.....	23
4.1 INSPECTIONS	23
4.2 MONITORING.....	23
4.3 MAINTENANCE AND REPAIR	23
5.0 REFERENCES	25

LIBRARY DISTRIBUTION LIST

TABLE OF CONTENTS (continued)

FIGURES

FIGURE 1. CAU 145 SITE LOCATION MAP	2
FIGURE 2. CAS 03-20-01, CORE STORAGE HOLES.....	6
FIGURE 3. CAS 03-20-02, DECON PAD AND SUMP.....	7
FIGURE 4. CAS 03-20-04, INJECTION WELLS	9
FIGURE 5. CAS 03-20-04, INJECTION WELLS	10
FIGURE 6. CAS 03-20-08, INJECTION WELL	11
FIGURE 7. CAS 03-99-13, DRAIN AND INJECTION WELL	12
FIGURE 8. CAS 03-25-01, OIL SPILLS.....	13

APPENDICES

APPENDIX A.1	Engineering Specifications and Drawings	A.1-1
APPENDIX A.2	Sampling and Analysis Plan	A.2-1
APPENDIX A.3	Project Organization	A.3-1

ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CADD	Corrective Action Decision Document
CAIP	Corrective Action Investigation Plan
CAP	Corrective Action Plan
CAS	Corrective Action Site(s)
CAU	Corrective Action Unit(s)
COC	contaminant(s) of concern
CR	Closure Report
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
DQI	Data Quality Indicator(s)
DQO	Data Quality Objective(s)
EPA	U.S. Environmental Protection Agency
ETS	Effects Test Support
FAL	Final Action Level(s)
FFACO	<i>Federal Facility Agreement and Consent Order</i>
ft	foot (feet)
gal.	gallons
LLW	low-level waste
NDEP	Nevada Division of Environmental Protection
NEPA	National Environmental Policy Act
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NNSA/NV	U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office
NSTec	National Security Technologies, LLC
NTS	Nevada Test Site
OI	Organization Instruction(s)
OP	Organization Procedure(s)
%R	percent recovery
PPE	personal protective equipment
QA/QC	Quality Assurance/Quality Control
RPD	relative percentage difference
REOP	Real Estate/Operations Permit
RWP	Radiological Work Permit
UR	Use Restriction
WGS	Waste Generator Services

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EXECUTIVE SUMMARY

Corrective Action Unit (CAU) 145: Wells and Storage Holes is listed in the *Federal Facility Agreement and Consent Order* (FFACO) of 1996 (FFACO, 1996). CAU 145 consists of six Corrective Action Sites (CASs) located in Area 3 of the Nevada Test Site (NTS), which is located approximately 65 miles northwest of Las Vegas, Nevada. CAU 145 consists of the following six CASs associated with the wells and storage holes:

- CAS 03-20-01, Core Storage Holes
- CAS 03-20-02, Decon Pad and Sump
- CAS 03-20-04, Injection Wells
- CAS 03-20-08, Injection Well
- CAS 03-99-13, Drain and Injection Well
- CAS 03-25-01, Oil Spills

Site characterization of the CAU 145 CASs was performed in 2005 and the results are presented in the CAU 145 Corrective Action Decision Document (CADD) (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2006). Briefly, the results of the site characterization and the scope of work required to implement the recommended closure alternatives include the following:

- **CAS 03-20-01, Core Storage Holes** is located within a fenced area of the core complex located north of 3-03 Road in Area 3 of the NTS. Results of the characterization reported no contaminants of concern (COCs) above Final Action Levels (FALs) (NNSA/NSO, 2006). No further action is required for this CAS. As a best management practice (BMP), the core storage holes will be grouted to grade.
- **CAS 03-20-02, Decon Pad and Sump** is located in the extreme northwest corner of Area 3 at the NTS just northeast of the intersection of Mercury Highway and 7-01 Road. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006). No further action is required for this CAS. As a BMP, the existing sump will be backfilled with grout to grade.
- **CAS 03-20-04, Injection Wells** is located within the Area 3 subdock of the NTS. It is situated just northeast of the intersection of Mercury Highway and 03-03 Road. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006). No further action is required for this CAS. As a BMP, the liquid contents will be removed from Site C injection well, the steam plant sump, and Site E steel-cased hole to the extent practical during field activities. The liquid contents will be either solidified or containerized in tankers and disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, sludge in the Site C injection well, the Site E steel-cased hole, and the steam plant sump will be left in place. Sites A, B, and C injection wells, Site D sump, Site E steel-cased hole, and the steam plant sump will be backfilled with grout to grade.

EXECUTIVE SUMMARY (continued)

- **CAS 03-20-08, Injection Well** is located in the J-6 yard in Area 3 of the NTS, just southwest of the LASL Post-Shot Building. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006). No further action is required for this CAS. As a BMP, the liquid contents will be pumped from the injection well and the sump to the extent practical during field activities and will be either solidified or containerized in tankers and disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, sludge in the injection well and sump will be left in place. The injection well and the sump will be backfilled with grout to grade.
- **CAS 03-99-13, Drain and Injection Well** is located at the core complex located north of 03-03 Road in Area 3 of the NTS. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006). No further action is required for this CAS. As a BMP, the injection well will be backfilled with grout to grade.
- **CAS 03-25-01, Oil Spills** is located within the Area 3 subdock of the NTS, just northeast of the intersection of Mercury Highway and 03-03 Road. Alternative 3, Close in Place with Administrative Controls, will include removing the liquid contents from the north pipe to the extent practical during field activities and backfilling with grout to grade; backfilling the south pipe with grout to grade; and implementing a Use Restriction around the perimeter of the contaminated area. Liquids will be either solidified or containerized in drums and disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, the small amount of sludge at the bottom of the north pipe will be left in place.

1.0 INTRODUCTION

Corrective Action Unit (CAU) 145: Wells and Storage Holes is listed in the *Federal Facility Agreement and Consent Order* (FFACO) of 1996 (FFACO, 1996). CAU 145 consists of six Corrective Action Sites (CASs) located in Area 3 of the Nevada Test Site (NTS), which is located approximately 65 miles northwest of Las Vegas, Nevada (Figure 1). CAU 145 consists of the following six CASs associated with the wells and storage holes:

- CAS 03-20-01, Core Storage Holes
- CAS 03-20-02, Decon Pad and Sump
- CAS 03-20-04, Injection Wells
- CAS 03-20-08, Injection Well
- CAS 03-99-13, Drain and Injection Well
- CAS 03-25-01, Oil Spills

Details of the site history and site characterization results for CAU 145 are provided in the approved Corrective Action Investigation Plan (CAIP), (U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office [NNSA/NSO], 2004), and the approved Corrective Action Decision Document (CADD) (NNSA/NSO, 2006).

1.1 PURPOSE

The purpose of this Corrective Action Plan (CAP) is to provide the detailed scope of work required to implement the recommended corrective actions as specified in the approved CADD (NNSA/NSO, 2006).

1.2 SCOPE

The results of the CAU 145 site characterization and the scope of work required to implement the recommended corrective actions as stated in the approved CADD (NNSA/NSO, 2006) are briefly summarized below.

CAS 03-20-01, Core Storage Holes is located within a fenced area of the core complex located north of 3-03 in Area 3 of the NTS. The complex consisted of the Core storage, Core handling, and EX-6 Effects Test Support (ETS) Buildings that were used to support core processing, “PIG” decontamination, and equipment disassembly operations. Results of the characterization reported no contaminants of concern (COCs) above Final Action Levels (FALs) (NNSA/NSO, 2006). No further action is required for this CAS. As a best management practice (BMP), core storage holes will be grouted and plugged to grade.

CAS 03-20-02, Decon Pad and Sump, is located in the extreme northwest corner of Area 3 at the NTS just northeast of the intersection of Mercury Highway and 7-01 Road. The CAS consists of releases associated with a decon pad that was used intermittently after the late 1960s to wash the dirt and grime from drilling rigs and other vehicles after field activities. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006).

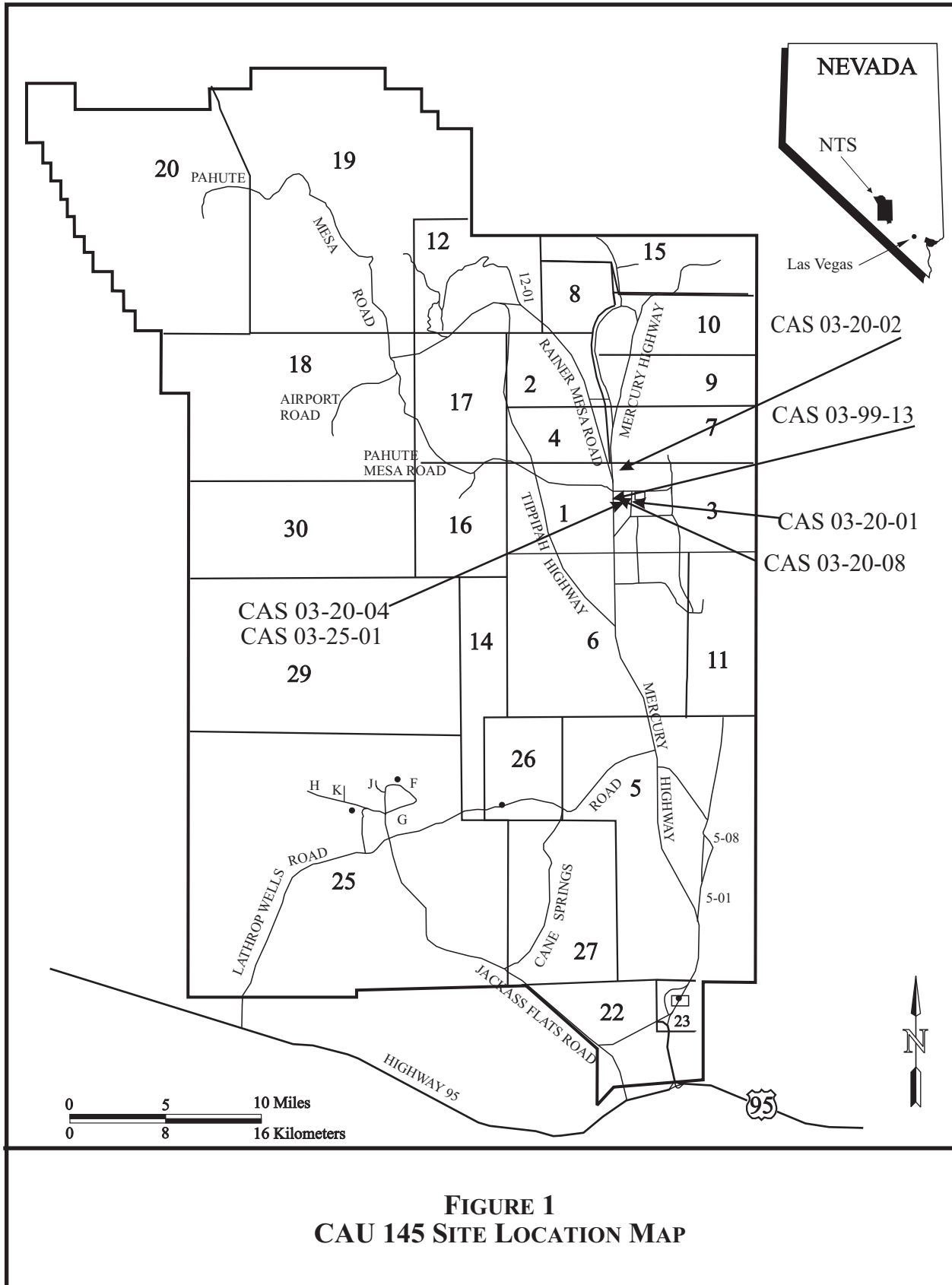


FIGURE 1
CAU 145 SITE LOCATION MAP

No further action is required for this CAS. As a BMP, the existing sump will be backfilled with grout to grade.

CAS 03-20-04, Injection Wells is located within the Area 3 subdock of the NTS. It is situated just northeast of the intersection of Mercury Highway and 03-03 Road. The Area 3 subdock complex was used for cleaning and repairing worn bits and realigning bent rods from the 1970s to 1985. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006). No further action is required for this CAS. As a BMP, the liquid contents will be removed from Site C injection well, the steam plant sump, and Site E steel-cased hole to the extent practical during field activities, and will be either solidified or containerized in tankers and disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, sludge in Site C injection well, the Site E steel-cased hole, and the sump will be left in place. Sites A, B, and C injection wells, Site D sump, Site E steel-cased hole, and the steam plant sump will be backfilled with grout to grade.

CAS 03-20-08, Injection Well is located in the J-6 yard in Area 3 of the NTS, just southwest of the LASL Post-Shot Building. The J-6 containment yard was used for testing blowout preventer and decontamination activities. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006). No further action is required for this CAS. As a BMP, the liquid contents will be pumped from the injection well and the sump to the extent practical during field activities, and will be either solidified or containerized in tankers and disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, sludge in the injection well and sump will be left in place. The injection well and the sump will be backfilled with grout to grade.

CAS 03-99-13, Drain and Injection Well is located at the core complex located north of 03-03 Road in Area 3 of the NTS. The complex consisted of the core storage, core handling, and WX-6 ETS Buildings that were used to support core processing, “PIG” decontamination, and equipment disassembly operations. Results of the characterization reported no COCs above FALs (NNSA/NSO, 2006). No further action is required for this CAS. As a BMP, the injection well will be backfilled with grout to grade.

CAS 03-25-01, Oil Spills is located within the Area 3 subdock of the NTS, just northeast of the intersection of Mercury Highway and 03-03 Road. The Area 3 subdock complex was used for cleaning and repairing worn bits and realigning bent rods from the 1970s to 1985. The site will be closed in Place with Administrative Controls. Closure activities will include removing the contents from the north pipe to the extent practical during field activities and backfilling with grout to grade; backfilling the south pipe with grout to grade; and implementing a Use Restriction (UR) around the perimeter of the contaminated area. Liquids will be either solidified or containerized in drums and disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, a small amount of sludge at the bottom of the north pipe will be left in place.

1.3 CORRECTIVE ACTION PLAN CONTENTS

This CAP consists of the following sections and appendices:

- Section 1.0 Introduction
- Section 2.0 Detailed Statement of Work
- Section 3.0 Schedule
- Section 4.0 Post-Closure Plan
- Section 5.0 References
- Appendix A.1 Engineering Specifications and Drawings
- Appendix A.2 Sampling and Analysis Plan
- Appendix A.3 Project Organization
- Library Distribution List

Appendix A.1 is included in this CAP as required by the approved FFACO CAP outline, but contains no material because engineering specification or drawings are not necessary for closure of CAU 145. Similarly, Appendix A.2 is included as required but contains no material, because Section 2.4 provides sufficient details on sampling.

This report was developed using information and guidance from the following documents:

- *Federal Facility Agreement and Consent Order* (FFACO, 1996)
- Corrective Action Investigation Plan for Corrective Action Unit 145 (NNSA/NSO, 2004)
- Corrective Action Decision Document for Corrective Action Unit 145 (NNSA/NSO, 2006)

2.0 DETAILED STATEMENT OF WORK

Three corrective action alternatives for CAU 145 were evaluated and identified in the CADD (NNSA/NSO, 2006).

Alternative 1 – No Further Action

Alternative 2 – Clean Closure

Alternative 3 – Close in Place with Administrative Controls

The approved Corrective Actions for the CAU 145 CASs include:

- CAS 03-20-01, Core Storage Holes
- CAS 03-20-02, Decon Pad and Sump
- CAS 03-20-04, Injection Wells
- CAS 03-20-08, Injection Well
- CAS 03-25-01, Oil Spills
- CAS 03-99-13, Drain and Injection Well

2.1 CORRECTIVE ACTIONS

The corrective action alternatives for CAU 145 are identified in the CADD (NNSA/NSO, 2006) and were approved by the Nevada Division of Environmental Protection (NDEP). The objective of the corrective actions is to prevent or mitigate adverse environmental impacts due to exposure and migration of surface and subsurface waste. The corrective actions for CAU 145 are identified below.

2.1.1 Alternative 1 - No Further Action

No Further Action (Alternative 1) is the approved corrective action for the following CASs.

2.1.1.1 CAS 03-20-01, Core Storage Holes

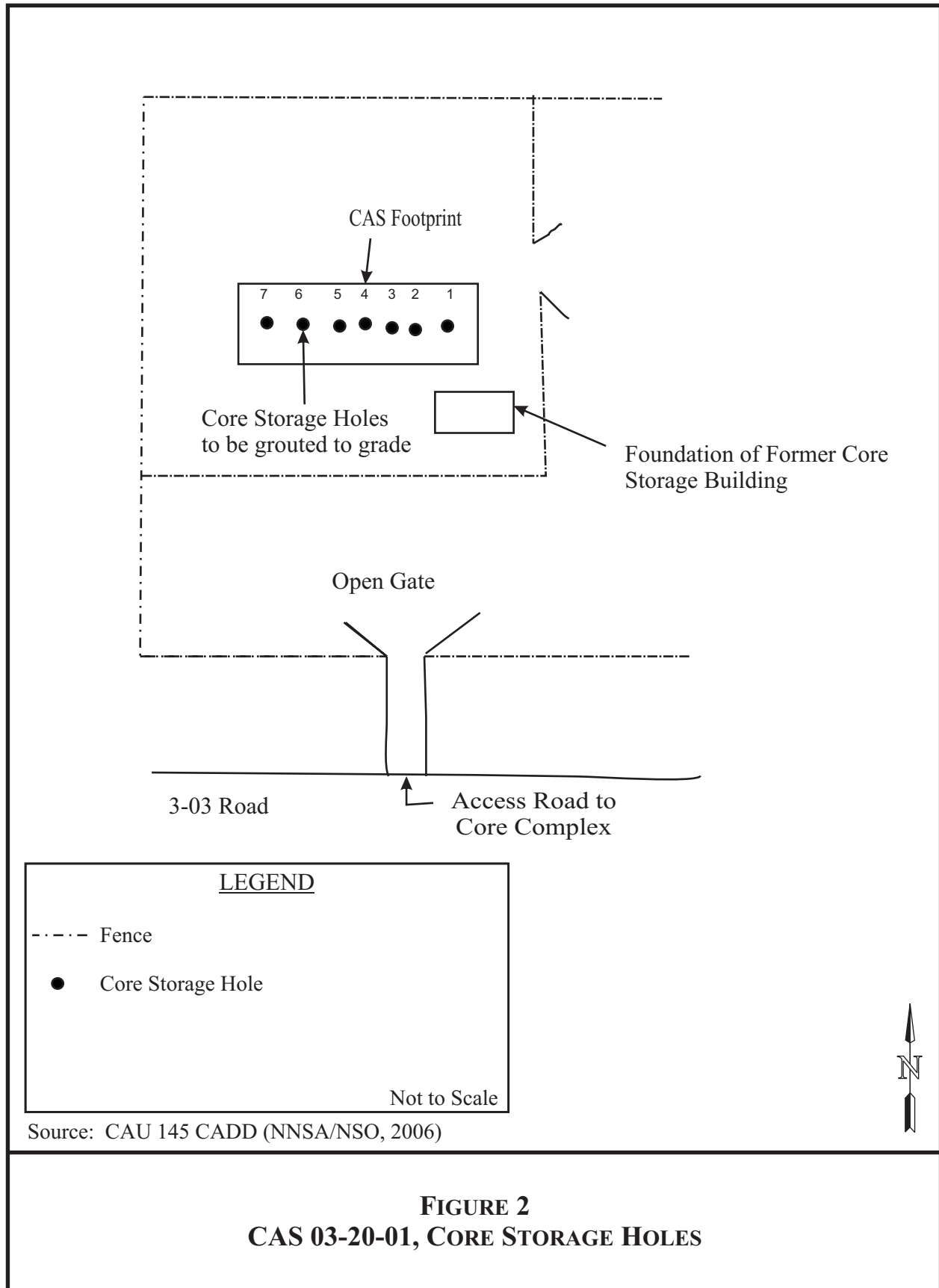
No COCs were identified at this CAS during site characterization; therefore, no further actions are required for site closure (NNSA/NSO, 2006). As a BMP, core storage holes will be grouted and plugged to grade (Figure 2).

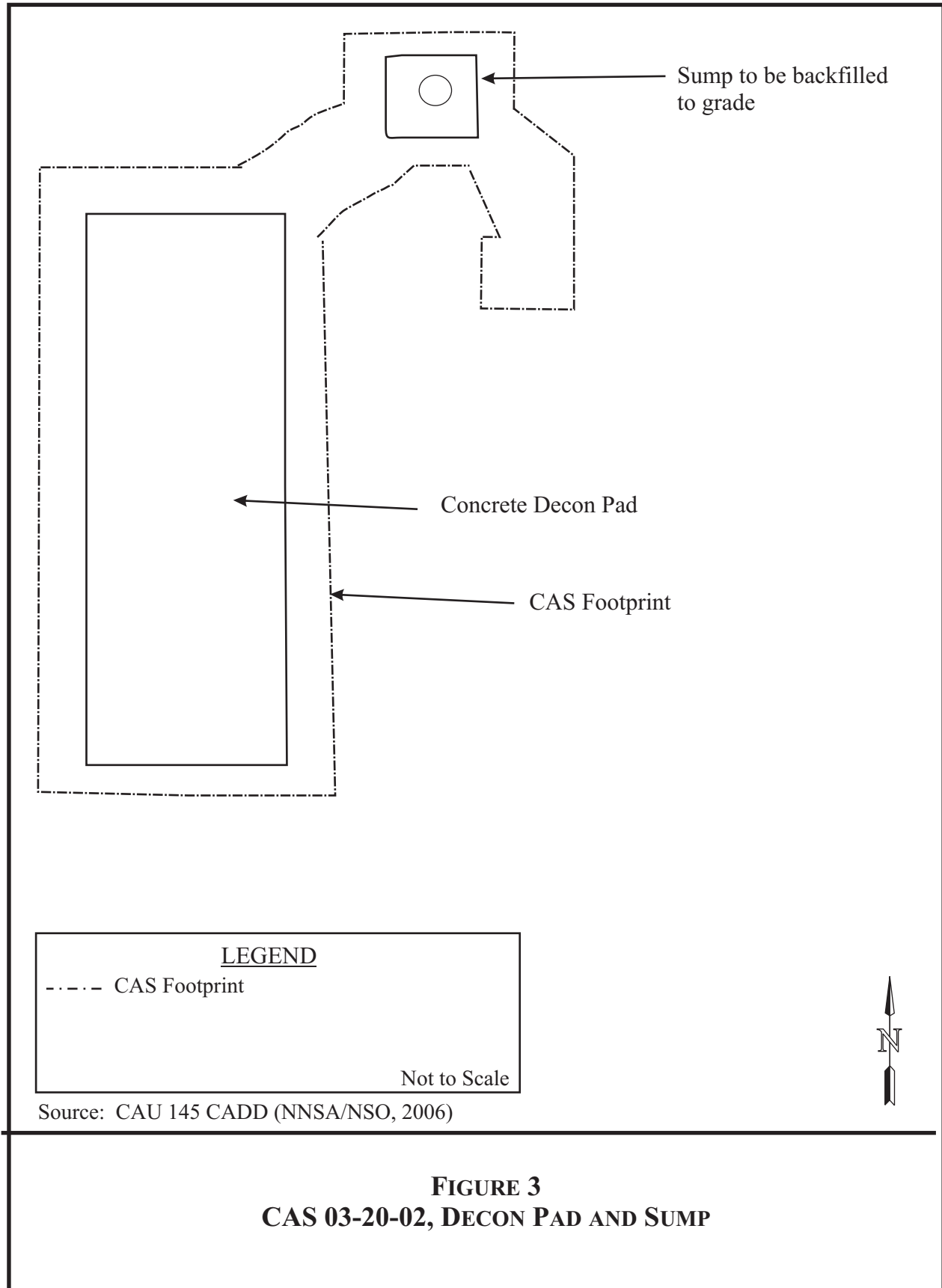
2.1.1.2 CAS 03-20-02, Decon Pad and Sump

No COCs were identified during site characterization; therefore, no further actions are required for site closure (NNSA/NSO, 2006). As a BMP, the existing sump will be backfilled with grout to grade (Figure 3).

2.1.1.3 CAS 03-20-04, Injection Wells

No COCs were identified at this CAS during site characterization; therefore, no further actions are required for site closure (NNSA/NSO, 2006). Based on dimensions provided in the CADD (Figures A.5-8 [radius 1 foot (ft) and liquid height 27.4 ft] and A.5-11 [radius 0.63 ft and liquid height 3 ft]), liquid volumes in the Site C Injection Well and the Site E steel-cased hole are





estimated to be 697 gallons (gal) and 31 gal, respectively. As a BMP, the liquid contents will be removed from the Site C injection well, the steam plant sump, and the Site E steel-cased hole to the extent practical during field activities (Figure 4) and will be either solidified or containerized in tankers.

Waste Generator Services (WGS) will develop a waste profile for disposal using data from the CAU 145 CADD and/or, if necessary, by collecting and analyzing waste characterization samples. Waste will be disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, sludge in the Site C injection well, Site E steel-cased hole, and the steam plant sump will be left in place. Sites A, B, and C injection wells, Site D sump, Site E steel-cased hole, and the steam plant sump will be backfilled with grout to grade (Figures 4 and 5).

2.1.1.4 CAS 03-20-08, Injection Well

No COCs were identified at this CAS during site characterization; therefore, no further actions are required for site closure (NNSA/NSO, 2006). Based on dimensions provided in the CADD (Pages A-95 [radius 4 ft and liquid height 20 ft] and A-97 [radius 1.25 ft and liquid height 1 ft]), liquid volumes in the injection well and the sump are estimated to be 8,138 gal and 40 gal, respectively. As a BMP, the liquid contents will be removed from the injection well and the sump to the extent practical during field activities (Figure 6) and will be either solidified or containerized in tankers. WGS will develop a waste profile for disposal using data for the CAU 145 CADD and/or, if necessary, by collecting and analyzing waste characterization samples. Waste will be disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, sludge in the injection well and the sump will be left in place. The injection well and the sump will be backfilled with grout to grade.

2.1.1.5 CAS 03-99-13, Drain and Injection Well

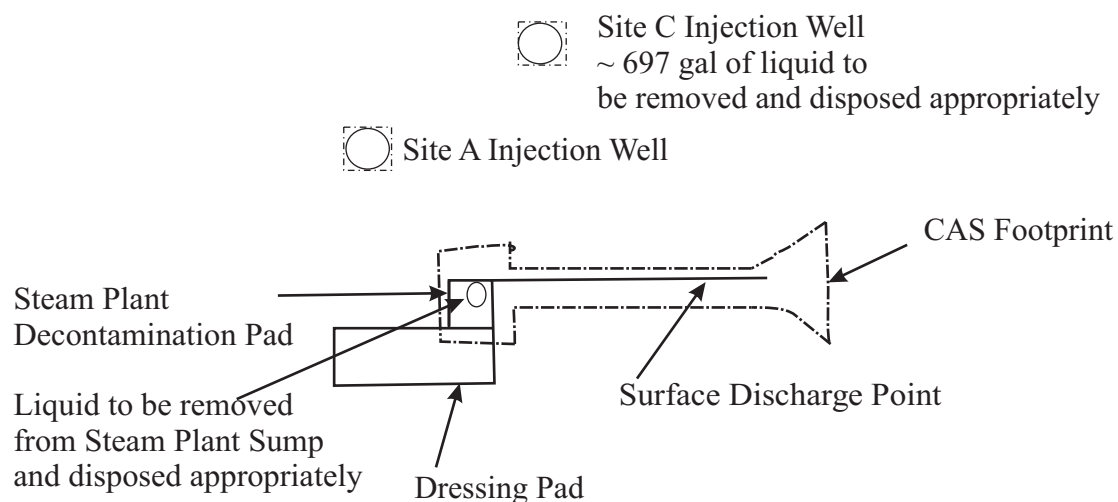
No COCs were identified during site characterization; therefore, no further actions are required for site closure (NNSA/NSO, 2006). As a BMP, injection well will be backfilled with grout to grade (Figure 7).

2.1.2 Alternative 3 – Close in Place with Administrative Controls


Close in Place with Administrative Controls (Alternative 3) is the approved corrective action for CAS 03-25-01, Oil Spills (NNSA/NSO, 2006).

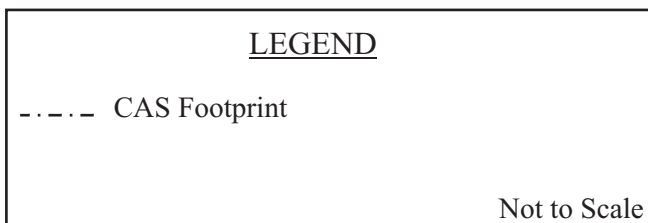
2.1.2.1 CAS 03-25-01, Oil Spills

Based on dimensions provided in the CADD (Page A-120 [radius 1 ft and liquid height 4 ft]), the volume of the liquid is estimated to be 102 gal. The contents will be removed from the north pipe (Figure 8) to the extent practical during field activities and will be either solidified or containerized in tankers. WGS will develop a waste profile for disposal using data from the CAU 145 CADD and/or, if necessary, by collecting and analyzing waste characterization samples. Waste will be disposed of at an appropriate disposal facility. According to the CADD, no COCs above FALs were identified in the sludge; therefore, the small amount of sludge at the



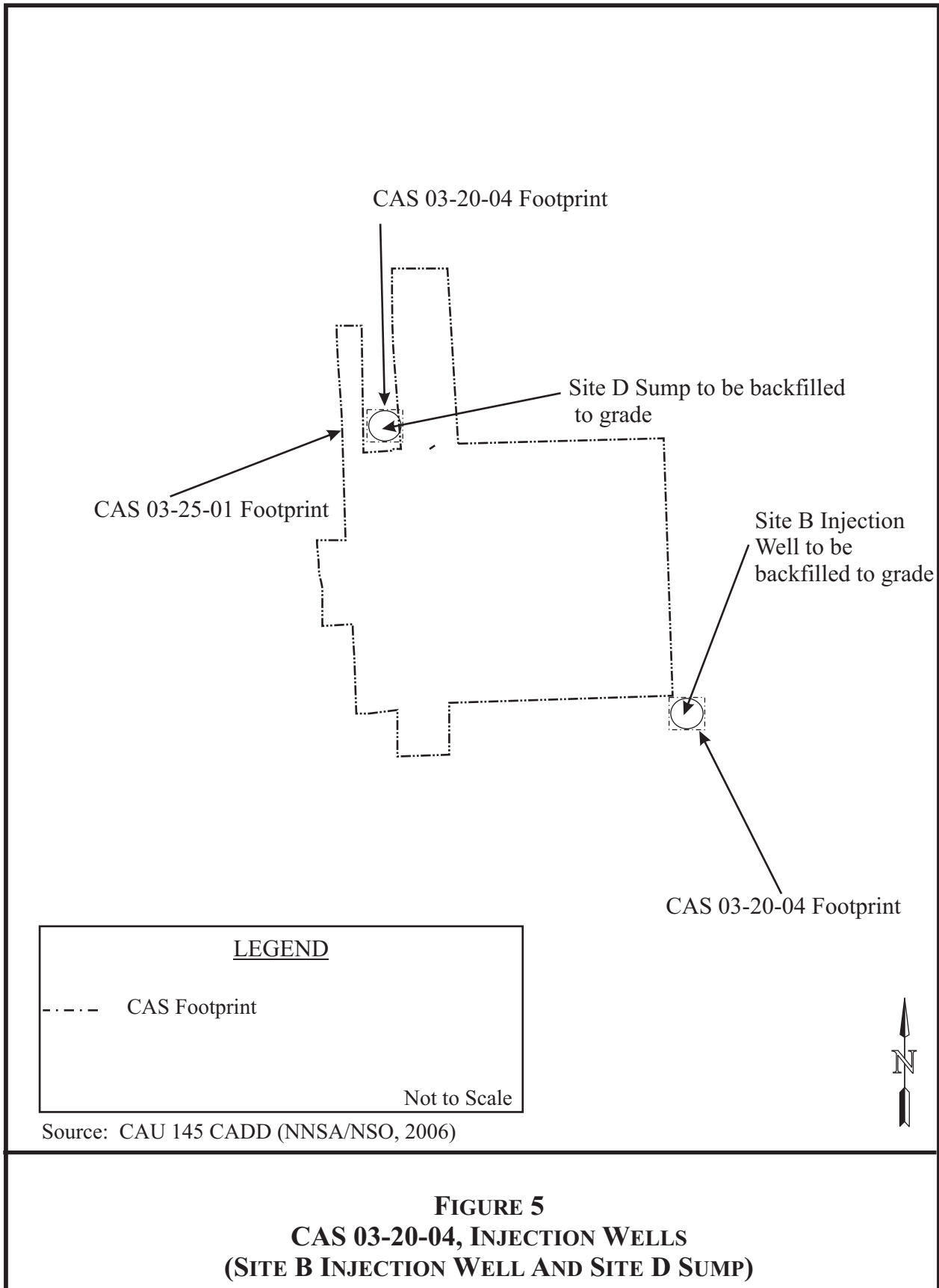
NOTE: Sludge in the Site C Injection Well, the Site E Steel-Cased Hole, and the Steam Plant Sump to be left in place. Sites A and C Injection Wells, Site E Steel-Cased Hole, and the Steam Plant Sump to be backfilled to grade

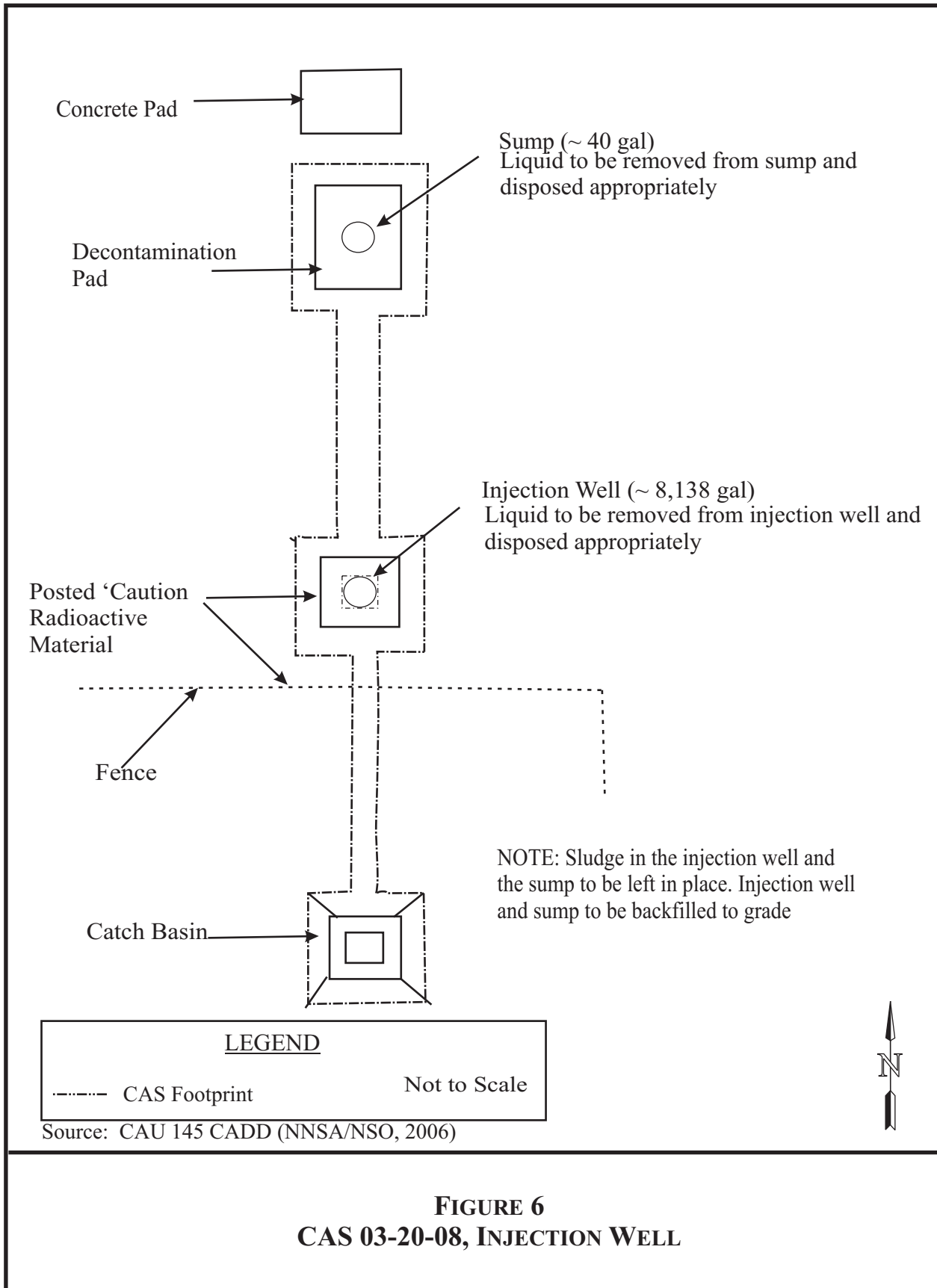
 Site E Steel-Cased Hole
 ~ 31 gal of liquid to be removed and disposed appropriately

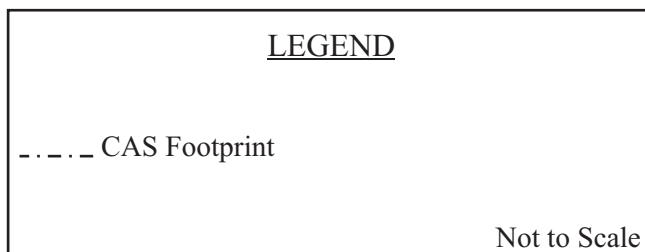
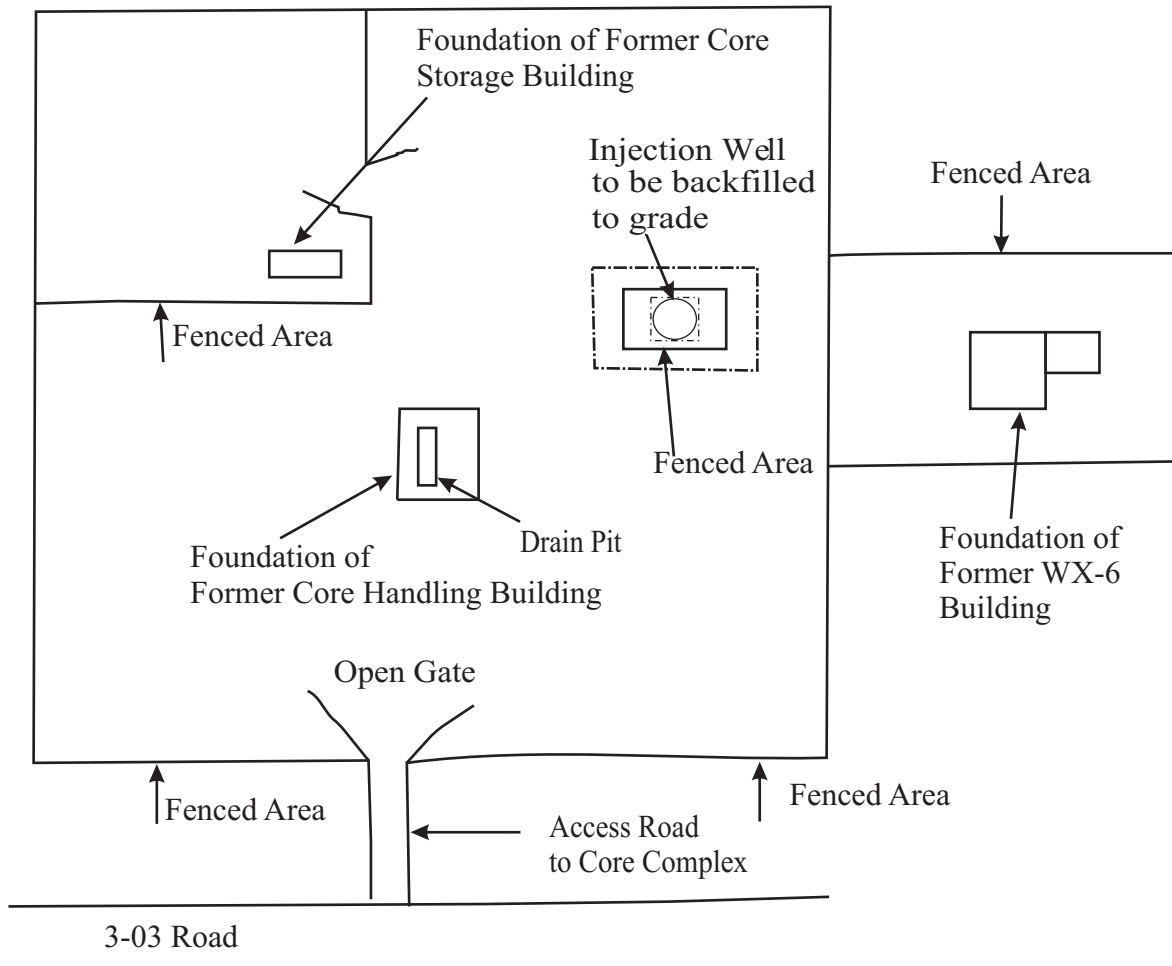


Source: CAU 145 CADD (NNSA/NSO, 2006)

FIGURE 4
CAS 03-20-04, INJECTION WELLS



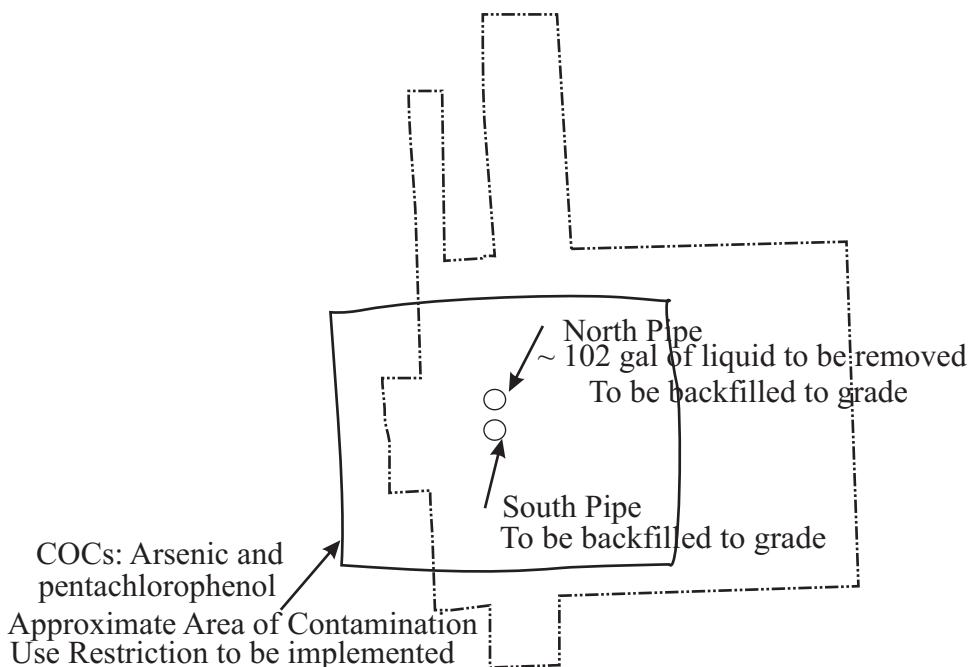




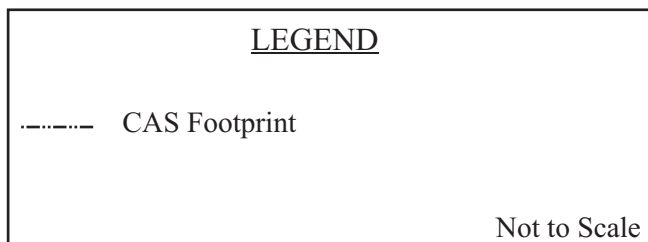
Source: CAU 145 CADD (NNSA/NSO, 2006)



FIGURE 7
CAS 03-99-13, DRAIN AND INJECTION WELL



Note: Sludge in the North pipe to be left in place.



Source: CAU 145 CADD (NNSA/NSO, 2006)



FIGURE 8
CAS 03-25-01, OIL SPILLS

bottom of the north pipe will be left in place. The north and south pipes will be backfilled with grout to grade.

Arsenic and pentachlorophenol in soil were identified as COCs (Figure 8). The vertical extent of contamination appears to be limited to 26-to 28-ft interval and concentrations decrease with depth below the preliminary action level or minimum detectable concentration (NNSA/NSO, 2006). It is expected that future use of the area will be minimal and access will be controlled.

Based on evaluation of alternatives identified in the CADD, close in place with administrative controls is the approved corrective action for this CAS. Therefore, the area of contaminated soil will be closed in place with administrative controls. The area will be secured by posting UR warning signs, and implementing a land UR (Figure 8).

2.2 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

Construction activities are limited to backfilling and removal of liquids from injection wells/sumps/pipes. No engineered structures will be constructed as part of site closure. Therefore, a construction quality assurance/quality control (QA/QC) plan is not required.

2.2.1 Construction Field Sample Collection Activities

Construction field samples are not necessary for the closure of the CASs listed in this CAP. Samples will be collected for the purpose of waste stream characterization and to verify that the approved cleanup criteria have been met. Field sample collection activities are addressed in Section 2.4.

2.2.2 Construction Laboratory/Analytical Data Quality Indicators

CAU 145 closure activities are limited to liquid removal from injections wells/pipes/sumps and backfilling. Therefore, a construction QA/QC plan is not required, and construction Data Quality Indicators (DQI) are not applicable. To ensure that backfill material remains consistent, all fill will be taken from an approved borrow source.

2.3 WASTE MANAGEMENT

All waste streams will be managed and disposed of in accordance with applicable state and federal regulations, U.S. Department of Energy (DOE) Orders, U.S. Department of Transportation, and the contractor's waste management procedures. CAU 145 closure activities are expected to generate sanitary waste/construction debris, low-level waste (LLW), and hazardous waste. Waste generated during closure activities will be properly managed and shipped to an onsite or offsite facility. Confirmation of waste disposal or transfer to National Security Technologies, LLC (NSTec) WGS for management and disposal will be included in the CAU 145 Closure Report (CR).

2.3.1 Waste Minimization

All work activities that generate waste will strive to minimize waste. Special care will be taken to properly characterize and segregate waste streams to avoid the generation of additional waste.

2.3.2 Waste Types

Sanitary Waste

Sanitary waste (e.g., non impacted personal protective equipment [PPE] and general trash) and construction debris (e.g., wood, concrete block, metal, plastic) removed from the site will be radiologically screened for free release (U.S. Department of Energy, Nevada Operations Office [DOE/NV], 2004) and disposed as sanitary waste in an onsite permitted landfill.

Low-Level Waste

Closure activities may potentially generate LLW. The waste will be characterized by process knowledge, laboratory analysis, and/or radiological screening; a profile for disposal will be prepared. All LLW will be properly characterized by WGS. All LLW shall be managed and disposed in accordance with approved Organization Procedure (OP) OP-2151.304, “Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site” (NSTec, 2004a), and all applicable state and federal regulations. All LLW will be packaged in the presence of a Waste Certification Official and WGS personnel according to OP-2151.304 (NSTec, 2004a). LLW will be stored in a radioactive materials area until transport to an appropriate disposal facility can be arranged.

Hazardous Waste

It is anticipated that a limited quantity of hazardous waste may be generated during removal of liquids from the injection wells, sumps, and pipes. The waste will be characterized by sampling, and a waste profile for disposal will be prepared. The waste will be managed and disposed according to all applicable procedures and state and federal regulations. Containers of waste will be stored in an appropriate waste accumulation area. Upon generation, the waste shall be containerized and stored in a satellite accumulation area or a 90-Day Hazardous Waste Accumulation Area depending on the amount of waste generated. After an approved waste profile is generated, the waste will be disposed of at an appropriate permitted treatment, storage, and disposal facility.

Decontamination Waste

All radiologically-impacted equipment will be surveyed prior to release from an exclusion zone. Any equipment that becomes contaminated during closure activities will be decontaminated on site. Dry decontamination will be the preferred method. For larger pieces of equipment that cannot be effectively decontaminated using dry decontamination techniques, wet decontamination techniques will be used. All decontamination rinsate will be managed appropriately in accordance with all applicable regulations, and once characterized, properly disposed.

Personal Protective Equipment

All PPE that becomes contaminated during closure activities shall be disposed of with the appropriate waste stream. All wastes generated during closure activities will be properly disposed in either onsite landfills or at a permitted offsite treatment, storage, and disposal facility.

2.4 CONFIRMATION OF CORRECTIVE ACTIONS

No verification samples will be collected since no COCs were found above FALs (NNSA/NSO, 2006). However, if it is required, waste characterization samples will be collected for disposal purposes.

2.4.1 No Further Action Sites

At five CASs, no COCs were found above FALs (NNSA/NSO, 2006). The sites will be closed by taking no further action; however, BMPs will be implemented at these CASs. The final site condition of these five CASs will be verified by visual inspection and photographic documentation included in the final CAU 145 CR. These CASs include:

- CAS 03-20-01, Core Storage Holes. No COCs were identified at this CAS. As indicated in Section 2.1.1, BMPs will be implemented at this CAS.
- CAS 03-20-02, Decon Pad and Sump. No COCs were identified at this CAS. As indicated in Section 2.1.1, BMPs will be implemented at this CAS.
- CAS 03-20-04, Injection Wells. No COCs were identified at this CAS. As indicated in Section 2.1.1, BMPs will be implemented at this CAS.
- CAS 03-20-08, Injection Well. No COCs were identified at this CAS. As indicated in Section 2.1.1, BMPs will be implemented at this CAS.
- CAS 03-99-13, Drain and Injection Well. No COCs were identified at this CAS. As indicated in Section 2.1.1, BMPs will be implemented at this CAS.

2.4.2 Close in Place with Administrative Controls

CAS 03-25-01. The final site condition of this CAS will be verified by visual inspection and photographic documentation included in the final CAU 145 CR. As indicated in Section 2.1.2, the UR and BMPs will be implemented at this CAS.

2.4.3 Sample Collection Methods

No verification samples will be collected since no COCs were found above the FALs (NNSA/NSO, 2006). If it is required, waste characterization samples will be collected. All samples will be collected by qualified WGS personnel. Samples will be collected by hand, using disposable pre-cleaned or decontaminated sampling equipment (NSTec, 2000a). Liquid samples will be collected using a dipper or other transfer devices (NSTec, 2003a). Sample collection date, time, and other pertinent information will be logged on a “Chain of Custody Record” form, and recorded in a bound project field notebook. Sample traceability is established and maintained by completing an “NSTec Service Request and Chain of Custody Record” form (NSTec, 2002).

All samples will be collected in clean containers, labeled appropriately, sealed with a tamper-proof seal, bagged, placed on ice in a cooler, and transported to the Environmental Technical Services group under a “Chain of Custody Record” form (NSTec, 2000b). Environmental Technical Services group will be responsible for sample management and

shipment of the samples to an approved offsite laboratory for analysis. Samples will be analyzed by U.S. Environmental Protection Agency (EPA)-approved analytical methods at EPA-approved laboratories (EPA, 1996). Sample analysis will include laboratory analysis of QA/QC samples and will follow stringent QA/QC procedures (EPA, 1996). Sample analysis for radionuclides will be performed in accordance with Environmental Measurements Laboratory Procedures Manual (DOE, 1997).

Waste characterization samples will be named by using the CAS number followed by the sample number (e.g., 032004-WC1).

One set of QA/QC samples will be collected for every 20 environmental samples or one per sample batch. QA/QC samples will include blind duplicates, matrix spike/matrix spike duplicates, and equipment rinsate samples. All blind duplicates will be labeled with a unique sample number.

2.4.4 Laboratory/Analytical Data Quality Indicators

Data Quality Objectives (DQO) are qualitative and quantitative statements that specify the quality of the data required supporting closure of a site. The DQO for the CAU 145 site investigation were defined in the CAIP (NNSA/NSO, 2004) using the Seven Step DQO Process developed by the EPA (EPA, 2000). Three Conceptual Site Models for the CAU 145 CASs were defined in the CAIP (NNSA/NSO, 2004), and these models were reconciled with the results of the site investigation in the CADD (NNSA/NSO, 2006). (See Appendix A of the CADD).

If it is required, waste characterization samples will be collected for disposal purposes. Sample analytical results will be generated during closure activities for CAS 03-20-04 (Injection Wells), CAS 03-20-08 (Injection Well), and CAS 03-25-01 (Oil Spills). All laboratory data generated during closure activities will be reviewed by project personnel to ensure the data are usable and complete according to the CAU 145 DQO. In addition, as specified in the *Industrial Sites Quality Assurance Project Plan* (U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office [NNSA/NV], 2002), 100 percent of the final data packages for verification samples will be evaluated at the Tier I and Tier II levels using applicable Organization Instructions (OIs). These include OI-2151.303 (NSTec, 2004b) for validating radiological data, and OI-2154.459 (NSTec, 2003b) for validating inorganic chemical data. OI-2154.459 is based on EPA functional guidelines (EPA, 2002). Any data determined not to be valid will be identified in the CR.

DQI are qualitative and quantitative statements that specify the data requirements of a project. The DQI include accuracy, precision, comparability, completeness, representativeness, and sensitivity. These DQI are discussed below.

Precision

Precision is a measure of agreement among a replicate set of measurements of the same property under similar conditions. This agreement is expressed as the relative percentage difference (RPD) between duplicate measurements (EPA, 1996). Precision applies to parameters sampled and analyzed in duplicate.

One duplicate sample will be collected per set of 20 or fewer verification samples. All duplicate samples will be collected from the same medium and analyzed for the same set of analytes as verification samples. The precision of the analytical results will be assessed by calculating the RPD for a verification sample and its duplicate sample results. An RPD of less than or equal to 30 percent indicates acceptable precision (NNSA/NV, 2002).

Accuracy

Accuracy is a measure of the closeness of an individual measurement or the average of a number of measurements to the true value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that result from sampling and analytical operations. This closeness is expressed as percent recovery (%R) (EPA, 1996). Accuracy will be assessed by examining the %R of laboratory control and spiked samples. A %R within the range of 70 to 130 percent indicates satisfactory analytical accuracy (NNSA/NV, 2002).

Representativeness

Representativeness is a qualitative evaluation of measurement system performance. It is the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition (EPA, 1996). Representativeness will be attained by ensuring that the sample locations, analytical parameters, analytical methods, sampling protocols, and sample handling all meet the project-specific objectives.

Comparability

Comparability is a qualitative measure that expresses the confidence that one data set can be compared to another. It will be achieved by using standardized field sampling procedures. The same analytical laboratory will perform the same analyses for all samples. Sample results will be reported in standard units to allow for comparison of the data.

Completeness

Completeness is a quantitative measure of data quality expressed as the percentage of valid data obtained that satisfies the project-specific requirements. Since a limited number of samples will be collected for both waste characterization and verification of closure, 100 percent of the data collected needs to be of acceptable quality to maintain acceptable QA/QC standards.

Sensitivity

Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest. This indicator is determined from the value of the standard deviation at the concentration level of interest. It represents the minimum difference of concentration that can be distinguished between two samples with a high degree of confidence. Sensitivity must be sufficient to detect contaminants at or below decision levels. Sensitivity will be achieved by analyzing all samples using appropriate EPA-approved analytical laboratories, methods, and instruments.

2.5 PERMITS

Prior to beginning field closure activities, planning documents and permits will be prepared. These documents will include a Field Management Plan, National Environmental Policy Act (NEPA) checklist, NNSA/NSO Real Estate/Operations Permit (REOP), Radiological Work Permit (RWP), NSTec Work Packages, excavation permits, and blind penetration permits.

2.5.1 National Environmental Policy Act Checklist

A NEPA Checklist will be completed prior to all excavation activities at the site. Excavation activities will follow all applicable federal, state, and local laws, regulations, and permits regarding protection of the environment.

2.5.2 NNSA/NSO Real Estate/Operations Permit

A REOP will be obtained prior to beginning closure activities. The permit will establish the NNSA/NSO as the prime authority possessing control of the site.

2.5.3 Radiological Work Permit

RWPs will be required for work at any radiologically-impacted site when radiological conditions require, as determined by NSTec Health Physics. RWPs will inform workers of the specific PPE necessary to protect them while performing their tasks and identify site-specific controls. The workers will be required to sign the permits and acknowledge their understanding of the requirements before entry into any contamination area, if present. The RWPs will be maintained by the Radiological Control Technician at the entrance to the contamination area. All site workers will be required to be Radiation Worker II-trained to perform any work within a radiologically controlled area.

2.5.4 Utility Clearances, Excavation Permits, and Blind Penetration Permits

An excavation permit and a blind penetration permit will be obtained prior to beginning any excavation activities. These permits require that a utility clearance be performed. A copy of the permit will be filed on site throughout the duration of the project.

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3.0 SCHEDULE

All preparation and field activities are scheduled for completion in Fiscal Year 2007. The FFACO deadline for the CR is June 30, 2008. Sufficient flexibility will be incorporated into the field schedule to allow for minor difficulties (e.g., weather, equipment failure). The NNSA/NSO shall notify the NDEP of any condition or event that may impact the project schedule.

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4.0 POST-CLOSURE PLAN

For CAU 145, the approved corrective action is Alternative 1 – No Further Action for CAS 03-20-01, CAS 03-20-02, CAS 03-20-04, CAS 03-20-08, and CAS 03-99-13; therefore, no post-closure monitoring is required. For CAS 03-25-01, the approved corrective action is Alternative 3 – Close in Place with Administrative Controls and will include posting UR warning signs and implementing URs at specified areas to prohibit any unauthorized intrusive activities. The post-closure inspections of the areas will be required to verify the posting and URs are maintained.

4.1 INSPECTIONS

Annual site inspections will be completed for CAS 03-25-01. Inspections will consist of annual visual inspections to verify that the UR postings are in place and readable, and that land URs are maintained. Any identified maintenance and repair requirements will be reported to NDEP, and maintenance will be scheduled within 90 working days of discovery. Inspections at this CAS will be performed annually or until advised otherwise by the NDEP.

Results of the post-closure inspection for a given year will be included in the annual NTS Industrial Sites Post-Closure letter report. The annual letter report will include the following information for CAU 145:

- Discussion of observations and inspections
- Copies of the site inspection checklists (blank copies will be included in the CAU 145 Closure Report)
- Records of any site maintenance activities

A copy of the NTS Industrial Sites Post-Closure annual letter report will be submitted to the NDEP.

4.2 MONITORING

Because no sampling or collection of data will be performed after closure of the CAU 145, no post-closure monitoring is required at CAU 145. However, as stated above, visual post-closure inspections will be performed for CAS 03-25-01.

4.3 MAINTENANCE AND REPAIR

If any maintenance or repair requirements are identified during the annual inspection of CAS 03-25-01, funding will be requested and the repair work scheduled. Any repair or maintenance performed at this site shall be documented in writing at the time of the repair and included in the NTS Industrial Sites Post-Closure annual letter report.

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5.0 REFERENCES

DOE, see U.S. Department of Energy.

DOE/NV, see U.S. Department of Energy/Nevada Operations Office.

EPA, see U.S. Environmental Protection Agency.

FFACO, see Federal Facility Agreement and Consent Order.

Federal Facility Agreement and Consent Order. 1996 (as amended). Agreed to by the State of Nevada, the U.S. Department of Energy, and the U.S. Department of Defense.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

NNSA/NV, see U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office.

NSTec, see National Security Technologies, LLC.

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U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2006. *Corrective Action Decision Document for Corrective Action Unit 145: Wells and Storage Holes, Nevada Test Site, Nevada*, DOE/NV--1118-Rev.0, Las Vegas, NV.

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National Security Technologies, LLC. 2002. Form-0732 “Service Request and Chain of Custody Record,” Las Vegas, NV.

National Security Technologies, LLC. 2003a. Organization Instruction OI-2154.120, “Soil, Waste, and Water Sampling for Characterization and Compliance,” Revision 0. Las Vegas, NV.

National Security Technologies, LLC. 2003b. Organization Instruction OI-2154.459, “Inorganic Data Verification and Validation,”. Las Vegas, NV.

National Security Technologies, LLC. 2004a. Organization Procedure OP-2151.304, “Radiological Waste Tracking, Handling, and Management at the NTS,” Revision 5. Las Vegas, NV.

National Security Technologies, LLC. 2004b. Organization Instruction OI-2151.303, “Validation of Radiological and Chemical Laboratory Data,” Las Vegas, NV.

APPENDIX A.1

ENGINEERING SPECIFICATIONS AND DRAWINGS

NOTE: Engineering specifications and drawings are not required for closure of CAU 145. This Appendix is included here as required by the approved *Federal Facility Agreement and Consent Order* outline for a Corrective Action Plan.

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APPENDIX A.2

SAMPLING AND ANALYSIS PLAN

NOTE: Sufficient details on waste characterization samples to be collected have been provided in Section 2.4. This Appendix is included here as required by the approved *Federal Facility Agreement and Consent Order* outline for a Corrective Action Plan.

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APPENDIX A.3

PROJECT ORGANIZATION

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PROJECT ORGANIZATION

For this project, the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) points of contact are as follows:

NNSA/NSO Federal Industrial Sites Sub-Project Director: Kevin J. Cabbie
Telephone Number: (702) 295-5000

NNSA/NSO Task Manager: Sabine Curtis
Telephone Number: (702) 295-0542

The identification of the project Health and Safety Officer and the Quality Assurance Officer can be found in the appropriate plan. However, personnel are subject to change and it is suggested that the appropriate U.S. Department of Energy Project Manager be contacted for further information. The Task Manager will be identified in the *Federal Facility Agreement and Consent Order* Monthly Activity Report prior to the start of field activities.

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